

dri2video

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X11 – Video Rendering

- Traditionally Xv extension used for rendering video
 - Xshm buffers: 2x memcpy
 - Not terribly good for hw decoders that have special memory requirements
 - And not terribly good for GPUs either.. need a copy into a GPU accessible buffer or at least map/unmap on every frame (userptr)
- DRI2
 - Used under the hood by VAAPI/VDPAU.. but can only support unscaled RGB buffers, so GPU blit YUV->RGB + scaling done on client side

X11 – dri2video

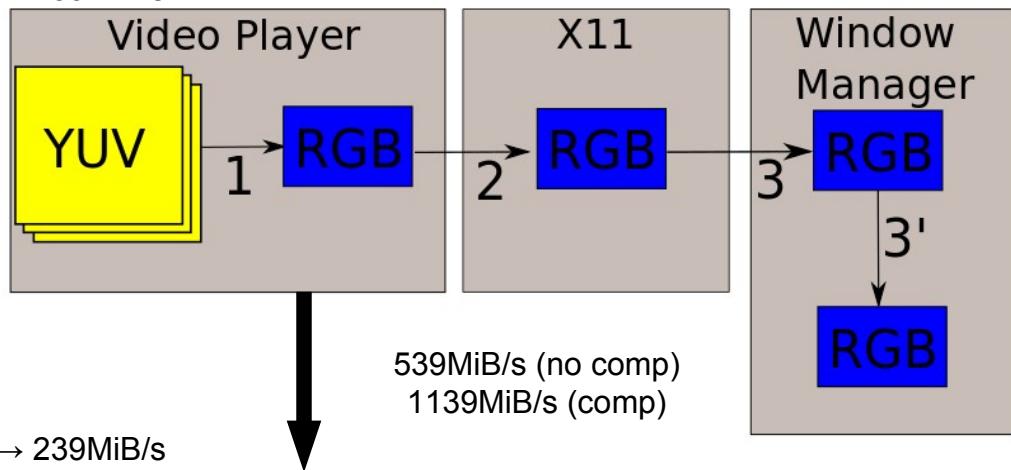
Example memory bandwidth savings based on 1080p 30fps NV12 video rendered to nearly fullscreen window on 1280x1024 display

$$\text{NV12} \rightarrow \text{RGB} = (1920 \times 1080 \times 1.5) + (1280 \times 1024 \times 4) \rightarrow 239\text{MiB/s}$$

$$\text{Swap/blit} = (1280 \times 1024 \times 4) * 2 \rightarrow 300\text{MiB/s}$$

$$\text{Composite} = (1280 \times 1024 \times 4) * 2 \rightarrow 300\text{MiB/s}$$

$$\text{Presentation blit} = (1280 \times 1024 \times 4) * 2 \rightarrow 300\text{MiB/s}$$

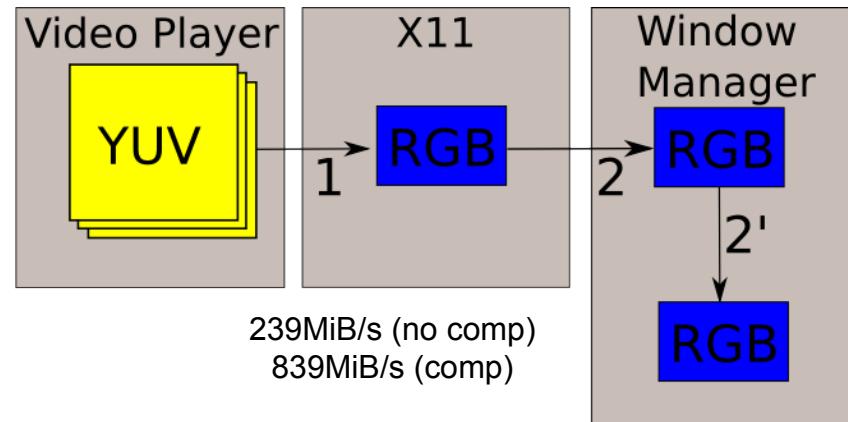


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X11 – dri2video

- Combines the ideas of Xv and DRI2
- Xserver (DDX driver) allocates GEM buffer and passes to client process
 - Allows to use VRAM or deal w/ any other special memory requirements
- But unlike DRI2, the buffer can be YUV (incl. Multi-planar), sized according to video size, not scaled drawable size, and cropped
- Can support zero-copy overlays too if display can scanout GEM buffers
- Should be helpful for other hw decoders: VAAPI, etc
 - Esp. UMA setups where the extra blit is consuming system memory bandwidth

Proto – New messages

- DRI2GetBuffersVid
 - Like DRI2GetBuffersWithFormat but adds width/height
- DRI2SwapBuffersVid
 - Like DRI2SwapBuffers but adds src crop coords
- DRI2SetAttribute / DRI2GetAttribute
 - Analogous to Xv Get/SetPortAttribute
 - CSC matrix, etc
- DRI2GetFormats
 - Get supported fourcc formats
 - Recommendation: use at least one '\0' or non 7-bit ascii character for custom formats
- DRI2BUFFER
 - Add extra name/pitch (for multi-planar formats)

Things missing

- Interlaced / Stereo
- Client process control over single buffer vs buffer per plane
- Destination coordinates
 - Preserve aspect ratio independent of dest drawable dimensions?
- Possible Idea
 - Make traditional dri2 and dri2video attachment points non-overlapping
 - Fallback to dri2 for anything dri2video can't do?